

Characterization of nanophotonic devices and subwavelength structures

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Subwavelength structures and photonic crystal devices are attracting growing attention due to their unique capabilities to control various properties of the optical field and their great potential for monolithic integration. In spite of recent advance in micro and nanofabrication technology, the fabrication of these devices is still challenging. The performance and the functionality of the fabricated devices often deviate from the theoretical expectation. Moreover, monolithic integration of discrete devices and their interactions on the nanoscale needs to be better understood by investigating near field interactions. It is, therefore, essential to develop near field characterization tools that allow accurate measurements of the individual structures and the interaction between various components. In this paper we present several characterization approaches including near field microscopy detecting complex amplitude, far field characterization and heterodyne imaging technique. Using these methods we demonstrate CW and ultrashort pulse response for various nanophotonic components including photonic crystals, photonic crystal waveguides, ultrashort plasmon-polariton waves in nanohole arrays, and other novel nanophotonic devices.